

m/035/009

May 25, 1999

Mr. W.R. Williams
Director Health, Safety and Environmental Quality
Kennecott Barneys Canyon Mining Co.
8200 West 9600 South
P.O. Box 311
Bingham Canyon, UT 84006-0311

DRAFT

Dear Mr. Williams:

Subject Public Notice, Draft Ground Water Discharge Permit No. UGW350001

Enclosed, please find the draft permit and statement of basis for the renewal of the Barneys Canyon ground water discharge permit. This draft will be made available for public comment for a 30-day period. After resolution of any comments received during that period, the final renewed permit will be issued.

This version of the permit incorporates most of your comments from your May 11, 1999 letter. There were some comments that would have resulted in permit conditions that would not meet our needs. Here are our responses to some of your specific comments:

Part I.D1(a)

Comment: "We wish to specify the analysis as alkalinity since this is actually the analysis that is performed from which carbonate and bicarbonate values are derived."

Response: Analysis of major ions may be used to identify different sources of water which may influence chemistry in monitor wells. Analytical results must be reported as carbonate and bicarbonate concentrations.

Part I.E.2

Comment: "Insert 'process' to clarify that the presence of condensate water or other

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non-process water is not subject to this provision. This is consistent with [Part] I.D.2. The reason for use of the on-site lab for rapid analysis of fluids is to differentiate between process and non-process water."

Response: Two different pond designs have been used at Barneys Canyon. The proper functioning of Best Available Technology (BAT) is called into question by the presence of any fluids in the leak detection sumps of the two older ponds, the presence of any fluids in the lower sump of the newer pond, or the presence of process solution flowing into the upper sump of the newer pond in excess of the permitted allowable leakage rate of 200 gal/acre/day. While the presence of fluids other than process water in the sumps does not constitute non-compliance with the permit's BAT requirements, it may indicate conditions under which monitoring of BAT performance is less certain than anticipated when pond design was approved. Presence of fluids in the sumps should be reported to allow us to evaluate the capability for BAT performance monitoring. Permit language has been changed to clarify reporting requirements.

Part I.D.1(f)

Comment: "Language concerning detection limits should be deleted because detection limits are in part sample dependant. Analytical methods will be selected that are usually capable of achieving the desired detection limits (a list of analytical methods will be provided to UDWQ). However, detection limits cannot be guaranteed for every sample due to possible interferences and other limitations."

Response: Language has been changed, according to your request to exempt cyanide amenable to chlorination from this requirement. You propose to monitor for total cyanide to demonstrate that total cyanide levels are below the permit limits for cyanide amenable to chlorination. Other routine monitoring parameters should not present any problems with detection limits. Background monitoring for metals has already been completed using detection limits which meet this requirement. It is important that you use the same analytical methods throughout the permit term, so a valid comparison may be made of monitoring data collected over time. Analytical methods can be changed with permission of the Executive Secretary.

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Part I.G.2

Comment: "Changes" [proposed for closure plan approval] "are for clarification. The closure document referenced should address the process facilities. The sulfide waste rock piles will be addressed under the Waste Rock Management Plan. Reclamation of waste rock dumps is regulated by UDOGM, and copies of these plans will be submitted to UDWQ as required under item 2.(b)."

Response: Closed mined areas and facilities can possibly cause a discharge of pollutants to ground water and as such may be regulated by DWQ. Reclamation required by DOGM (the Division of Oil, Gas and Mining) does not specifically address potential ground water pollution. As the time of mine closure approaches, it is a permit condition that you develop appropriate closure plans to prevent post-closure ground water pollution. These plans should be developed near the time of closure and not at the present, because they can then consider factors like the extent and configuration of the disturbed area, types of rock encountered, and current reclamation technology at the time of closure. These plans must be approved by DWQ before implementation. The requirement for submittal of plans required by DOGM and any other agencies is to insure compatibility with plans for prevention of ground water pollution required by this permit.

You may comment on this draft of the permit during the public comment period. All comments will be resolved before issuance of the final permit. Please contact me if you have any questions.

Sincerely,

Mark Novak, Environmental Scientist
Ground Water Protection Section

MN:mtn

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Enclosures (3)

cc: Salt Lake City/County Health Dept. (W/encl)
Tony Gallegos, DOGM (W/encl)
Lyle Stott (W/encl)

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FILE:Barneys Canyon

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STATEMENT OF BASIS

Heap Leach Operation

KENNECOTT BARNEYS CANYON MINING CO.

P.O. Box 311

Bingham Canyon, Utah 84006-0311

I. DESCRIPTION OF FACILITY

Barneys Canyon Mine operates a cyanide gold leaching facility west of Salt Lake City about two miles north of Copperton, Utah, on the east flank of the Oquirrh Mountains. Ore is obtained from mine pits southwest of the leach pads. The site is an east sloping alluvial apron at an elevation of about 5,500 feet and precipitation is light.

The leach pads, processing ponds, processing plants, pits, waste rock dumps and ancillary facilities are operated under the concept that there is no intentional direct discharge to waters of the State. All process fluids are recirculated to the distribution system atop the leach pads. Gold ore on the leach pad is leached with a high pH solution containing NaCN. The high pH is maintained by additions of NaOH. Cyanide solution containing gold is collected at the base of the heap pad and piped to and stored in a pregnant pond. The solution is pumped from the pregnant pond to the processing plant where the gold is removed by a carbon adsorption process and the remaining solution flows by gravity to the barren pond. Additional NaOH and cyanide are added to the solution stored in the barren pond and pumped to the distribution system atop the heap pads. Additional water is added at this point to make up for the water lost by evaporation.

A. DESCRIPTION OF LEACH SOLUTION

The leach solution generally contains about 0.3 pounds of caustic soda (NaOH) per thousand gallons of water and 0.1 to 0.6 pounds sodium cyanide (NaCN) per ton of water. The solution equivalent is about 50 ppm to 300 ppm NaCN. The solution is pumped in pipes to the top of a leach pad where it is distributed at the rate of about 3 to 6 gallons per day per square foot. NaOH is used to maintain a pH greater than 10, in order to keep the NaCN in solution. The chemical composition of the process

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solutions varies as they move through different stages of the gold extraction process. At all stages of the process, the solutions have high sulfate content, generally greater than 2000 mg/l. Metals listed in Table 1 of the Ground Water Protection Regulations are present at low to moderate concentrations, generally below 20 mg/l.

B. DESCRIPTION OF PROCESS FLUID CONTROL TECHNOLOGY AND LEAK DETECTION SYSTEM

Each leach pad consists of several cells. The leach pad's vertical configuration starting at the top consists of several layers:

1. Three to five foot thick process solution collection system of fine grained ore, with head less than 12 inches.
2. Sixty mil HDPE primary liner.
3. Twelve inch minimum secondary soil liner having a hydraulic conductivity of 1.0×10^{-7} cm/sec or less.
4. Below the clay, a 6-inch leak detection media having a hydraulic conductivity of 1.0×10^{-3} cm/sec or higher. At the bottom of the media, slotted sloping PVC leak detection pipes have been installed.
5. Six inch minimum engineered secondary soil liner having a hydraulic conductivity of 1.0×10^{-6} cm/sec or less.

In the event of a break in the HDPE liner, and if fluids are able to migrate through the clay liners and the permeable medium, they will flow through the PVC pipe into sumps or ports where they will be detected. The pad or sections of the pads where the break occurred can then be shut down.

C. DESCRIPTION OF GEOLOGY

The leach site is located on the east flank of the Oquirrh Mountains on the surface of an old east dipping alluvial fan. The fan deposit ranges from 100 to 200 feet thick and consists of sand, gravel and clay. Volcanic rocks underlie the alluvial material. These rocks consist of agglomerates, mudflow deposits and lava flows, and are probably less permeable than the overlying alluvium. The water table slopes downward to the east, and

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according to data from the monitoring wells ranges from 82 to 380 feet in depth. The site is, therefore, part of the recharge area for the aquifers in the Salt Lake Valley. A production well (BC-280) for the site obtains about 280 to 300 gpm.

II. CLASSIFICATION OF GROUND WATER

Based on monitoring done for the permit to date, ground water in the mine area is classified as Class II. On the basis of sampling done since the permit was originally issued, background water quality, protection levels and out-of-compliance levels have been revised. The protection levels at the site for total dissolved solids are 1.25 times the background value. When a contaminant is present in a detectable amount in the background concentration, the concentration of the pollutant may not exceed 1.25 times the background concentration, or exceed 0.25 times the ground water quality standard, whichever is greater. When a contaminant is not present in a detectable amount, the concentration of the pollutant may not exceed 0.25 times the ground water quality standard, or exceed the limit of detection, whichever is greater.

III. PERMIT CONDITIONS

- A. To maintain compliance with Ground Water Protection levels, best available treatment technology is used. This requires no discharge of process fluids from the facility to ground water. Well monitoring is required to demonstrate that compliance with ground water protection levels is being maintained. Maintenance of BAT will be demonstrated by the absence of process fluids in leak detection sumps of pads and ponds.

A closure document shall be submitted for review and approval six (6) months prior to the end of the operational term of any heap leach pads in the project. The closure criteria will either be as adopted in rules by the Water Quality Board at the time of decommissioning or as approved in writing at the time of decommissioning if prior to adoption of rules. **In no case shall the closure criteria for this heap leach project result in exceedance of ground water compliance levels for this site or degradation of beneficial uses of ground or surface water in the vicinity.**

Closure of ore heaps based on the approved criteria must be verified in three consecutive monthly samples of heap leach pad drain down liquid. The sampling procedure must be submitted in the closure plan for review

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and approval.

Leach pads and waste rock dumps must be reclaimed in such a way that ground water pollution is prevented.

B. Leak Detection System--Monitoring

All leak detection sumps, pipes and ponds are to be monitored daily during use of the heap leach pads to demonstrate that best available technology performance is maintained. In the event that a verified leak is detected beneath the pads or ponds, it is to be reported by telephone within 24 hours and in writing within 5 days to the Division of Water Quality (DWQ).

C. New Construction

A construction permit must be obtained from DWQ for construction of any new facilities which may cause a discharge of pollutants to waters of the state, or modification of any existing permitted facilities. Such construction may also require modification of this permit.

D. Ground Water Compliance Monitoring

Upgradient monitor wells BCG-280 and BCG-281 are to be sampled twice yearly and the downgradient wells quarterly. Ground water quality protection levels described in the permit will be used to make any determinations of possible out of compliance. Water quality data are to be collected and reported to the DWQ on a quarterly basis. In the event that a compliance level is exceeded, corrective and remedial action will be determined by the company and the DWQ. As a result of detection of cyanide in monitor well BCG-848, the permittee conducted an investigation which involved drilling four new monitor wells. These wells will be included in this renewed permit as points of compliance.

Monitoring parameters have been changed in this version of the permit. Previous monitoring was for metals listed in Table 1 of the ground water protection regulations. These metals do not exist in detectable concentrations in the background, as revealed by monitoring during the previous permit term. They are present in relatively low concentrations in the process water solutions and they are also not particularly mobile in aquifer materials. Under the renewed permit, monitoring will be for parameters which are indicative of a release of process waters. These

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parameters include major ions, which are present in different proportions in the ground water as compared to the process solutions; cyanide, which is a synthetic chemical present in the process solutions but not naturally present in the ground water; and nitrate, a degradation product of cyanide. Analysis for major ions also includes sulfate, which is present in high concentrations in the process water solutions. Most of these parameters are highly mobile in ground water and should result in early detection of a release of process waters. If monitoring for these parameters reveals leakage from the mine facilities, the permittee must monitor for other contaminants which may have been released as part of a Contaminant Investigation as required under R317-6-6.15.

E. Mine Pit Water

Water from mine pits at this site, after primary sediment treatment, may be used for dust suppression, process operations or piped for use to the Copperton concentrator. Other use or disposal will require approval from the Division of Water Quality.

F. Compliance Schedule

Temporary storage of sulfide ore was permitted in the original version of the permit under conditions which are no longer appropriate for the actual operating conditions at the mine and which would have expired at the end of 1998. The permittee has developed new plans for managing the sulfide ore stockpiles which reflect changes which were not anticipated in earlier versions of the permit. This new language shall be incorporated into the Waste Rock Management Plan which is part of Barneys Canyon Environmental Compliance Manual.